

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF HAWAII

In the Matter of the Application of)  
HAWAIIAN ELECTRIC COMPANY, INC. )  
For Approval to Commit Funds in )  
Excess of \$500,000 for Item Y00035, )  
the Honolulu 9 HP/LP Turbine )  
Blading Project. )  
\_\_\_\_\_ )

DOCKET NO. 03-0006

DECISION AND ORDER NO. 20124

Filed April 15, 2003  
At 2:00 o'clock P.M.

Karen Higashi  
Chief Clerk of the Commission

ENV. OF CONSUMER ADVOCACY  
DEPT. OF COMMERCE AND  
CONSUMER AFFAIRS  
STATE OF HAWAII

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Commission, State of Hawaii.

K. Higashi

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DECISION AND ORDER

I.

By application filed on January 9, 2003, HAWAIIAN ELECTRIC COMPANY, INC. (HECO) requests commission approval to commit approximately \$2,199,200 to undertake and complete the Honolulu unit 9 HP/LP Turbine Blading project (project). HECO makes its request in accordance with Section 2.3.g.2 of General Order No. 7 (G.O. No. 7), *Standards for Electric Utility Service in the State of Hawaii*.

Copies of the application were served on the Department of Commerce and Consumer Affairs, Division of Consumer Advocacy (Consumer Advocate).

By Order No. 19967, filed on January 15, 2003, the commission approved HECO's request for a waiver of G.O. No. 7, Section 2.3.g.2's requirement that it file the application at least 60 days prior to "the commencement of construction or commitment for expenditure of funds[.]" Approval of the waiver, HECO explained, will allow it to commit funds for the project

earlier than the 60 days after the filing of the instant application. At the same time, the commission noted:

[Order No. 19967] does not constitute a decision on the merits of HECO's application. HECO acknowledges that if the commission does not approve the application, HECO 'will have the burden of proof to justify the reasonableness of the capital expenditures in the next rate case.'

On April 4, 2003, HECO submitted its responses to the Consumer Advocate's information requests. By position statement filed on April 9, 2003, the Consumer Advocate does not object to the commission's approval of HECO's application.

On April 11, 2003, HECO responded to the commission's information request, confirming that the project was completed on March 22, 2003, "when Honolulu 9 was placed on-line following the completion of its overhaul."

## II.

### A.

Commissioned in 1957, Honolulu unit 9 (aka Honolulu 9) is a nominal 54 megawatt non-reheat steam unit. It is one of two cycling units currently in operation at the Honolulu generating station. Honolulu 9 consists of a two cylinder, tandem-compound, condensing steam turbine manufactured by Westinghouse Electric Corporation.

The Honolulu 9 unit starts-up each weekday morning, prior to the morning peak, and shuts down following the evening peak. In addition, HECO states that Honolulu 9 "also runs as system requirements dictate."

The exhaust opening of the high pressure (HP) turbine is at the top of the cylinder. Steam passes into the low pressure (LP) turbine through a crossover pipe.

The LP turbine is a double flow type with steam entering at the center of the blade path and flowing toward the exhaust opening at each end. The HP and LP turbine rotors are connected to the generator rotor, which provides the rotating magnetic field required to generate electrical power.

The HP turbine consists of one stationary and two rotating rows of impulse blading in the Curtis Stage and 26 pairs (rotating and stationary) of rows of reaction blading. The LP turbine consists of 12 pairs (rotating and stationary) of rows of reaction blading, six pairs of rows in each end.

Diagrams of Honolulu 9, including the HP and LP turbine blades, are set forth in Exhibits I and II of the application.

#### B.

On November 30, 2002, HECO commenced its scheduled overhaul of Honolulu 9, including the inspection of the steam turbine. Testing and visual inspection performed by Reinhart & Associates, Inc., nondestructive evaluation specialists, revealed that the HP and LP turbine blades were severely deteriorated and required replacement during Honolulu 9's scheduled overhaul period.<sup>1</sup> Specifically, HECO states that 19 per cent of the rows

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<sup>1</sup>See HECO's response to CA-IR-1, which includes photographs of the deteriorated blades.

of blades in the turbine need replacing, 16 per cent in the HP turbine and 25 per cent in the LP turbine.<sup>2</sup>

HECO's vendor, Diversified Energy Services, Inc., removed the old blades and installed the new blades that were manufactured by Turbo-Care.<sup>3</sup> In addition, the L-3 rotating blades and the lower and upper cylinder shells of the LP turbine were repaired. HECO intends to capitalize the cost of the replacement work and expense the cost of the repair work.

The projected service life of Honolulu 9 is until the year 2024. With the project's completion, "the retirement review date for Honolulu 9 remains at 2024." HECO "does not anticipate any changes in operation and maintenance expenses due to the new turbine blades." In addition, based on industry experience with turbines, "HECO expects the new blades to operate reliably through the 2024 Honolulu 9 retirement review date."

C.

In this instance, HECO pursued the replacement of the blades in lieu of repairing.<sup>4</sup> Thus, in support of the replacement project, HECO states:

1. If a blade failure occurred in the HP and/or LP turbine, the consequential damage could result in catastrophic failure of the HP and/or LP sector

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<sup>2</sup>Pages 4 and 5 of the application list the specific blades that need replacing.

<sup>3</sup>HECO's response to CA-IR-4.

<sup>4</sup>With the exception of the L-3 rotating blades and the lower and upper cylinder shells of the LP turbine, which were repaired.

and could cause an extended forced outage of the unit of approximately two years.<sup>5</sup>

This could adversely impact system reliability and scheduled maintenance on other units.

2. Because of the blades severe deterioration, any repairs "would only be temporary because there isn't enough base metal remaining to sustain a long-term repair."
3. Diversified Energy Services, Inc., as part of its written repair estimate, could not "guarantee the integrity of [any blade] repairs due to the extent of the damage."
4. The cost for a temporary repair of the blades "is higher than the cost for blade replacement, which includes upgraded material to provide greater reliability."
5. All of the blades proposed for replacement "are non-repairable and require replacement for technical reasons."

It is an industry standard to replace blades that are severely eroded past the back edges of the stellite strips.

6. Turbo-Care had the best lead-times for blade deliveries "and provided very competitive pricing for high quality materials."
7. HECO "has had very good experience with [Diversified Energy Services, Inc.] and Turbo-Care on previous turbine blade replacement projects." Their workmanship and quality of products and services, HECO states, "have been outstanding."

HECO utilized the written estimates submitted by Diversified Energy Services, Inc. to prepare the cost estimates set forth in the application.

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<sup>5</sup>In its response to CA-IR-3, HECO describes with specificity the potential consequential damage and catastrophic failure that could result from the failure of the turbine blades.

### III.

The Consumer Advocate examined: (1) the continued need for Honolulu 9; (2) the project's estimated costs; and (3) the project's need.

#### A.

The Consumer Advocate evaluated the possible consequences of retiring Honolulu 9 in 2003. Noting that "the review date for the retirement of Honolulu 9 is 2024[,]" the Consumer Advocate states, "it appears there will be a continued need, beyond the near future, for the generation produced by Honolulu 9." Thus, it does not object to the need for Honolulu 9 in this application.

At the same time, the Consumer Advocate expresses its general comments that:

1. An ongoing review of HECO's reliability guidelines is required, in the context of HECO's adequacy of supply report, dated January 2003. Thus, in response to HECO's report, the Consumer Advocate issued information requests to HECO on March 17, 2003.
2. Additional projects will be required to keep Honolulu 9 operating to the year 2024, and HECO has not re-evaluated the cost-effectiveness of continuing to operate Honolulu 9 in light of these additional costs. However, the Consumer Advocate recognizes that this concern is better addressed in HECO's next Integrated Resource Plan, scheduled for filing in 2005.

#### B.

The Consumer Advocate notes that 99 per cent of the project's total estimated cost is based on the written estimates

submitted by Diversified Energy Services, Inc.<sup>6</sup> It does not object, at this time, to the project's estimated cost.

Concomitantly, the Consumer Advocate reserves the right to review the project's actual costs when the final cost report is filed, and pursue "the reasonableness of including the actual project costs in rate base in HECO's next rate proceeding." In this regard, the Consumer Advocate recognizes that the project amounts for on-costs and AFUDC are estimates only.

#### C.

Noting the physical condition of the blades and the significant consequences that may result from their failure, the Consumer Advocate concludes that "the repair and replacement of the HP and LP turbine blades for Honolulu 9 [appears] necessary at this time." Thus, it does not object to the approval of HECO's application.

#### IV.

Honolulu 9 serves as a crucial source of capacity for HECO's utility system. Upon careful review, the commission finds that the project is reasonable and consistent with the public interest. Accordingly, the commission will approve the expenditure of funds for the project.

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<sup>6</sup>The remaining one per cent comprises AFUDC, aka allowance for funds used during construction.



V.

THE COMMISSION ORDERS:


1. HECO's request to expend an estimated \$2,199,200 for the Honolulu 9 HP/LP Turbine Blading project is approved; provided that no part of the project may be included in HECO's rate base unless and until the project is in fact installed, and is used and useful for public utility purposes.

2. HECO shall submit a report within 60 days of the project's commercial operation, with an explanation of any deviation of 10 per cent or more in the project's costs from that estimated in the application. HECO's failure to submit this report will constitute cause to limit the cost of the project, for ratemaking purposes, to that estimated in the application.


DONE at Honolulu, Hawaii this 15th day of April, 2003.


PUBLIC UTILITIES COMMISSION  
OF THE STATE OF HAWAII

By   
Wayne H. Kimura, Chairman

By   
Janet E. Kawelo, Commissioner

APPROVED AS TO FORM:

  
Michael Azama  
Commission Counsel

By   
Gregg J. Kinkley, Commissioner

03-0006.sl

CERTIFICATE OF SERVICE

I hereby certify that I have this date served a copy of the foregoing Decision and Order No. 20124 upon the following parties, by causing a copy hereof to be mailed, postage prepaid, and properly addressed to each such party.

DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS  
DIVISION OF CONSUMER ADVOCACY  
P. O. Box 541  
Honolulu, HI 96809

WILLIAM A. BONNET  
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Karen Higashi

DATED: April 15, 2003